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Suppose now that reductions were calculated for every tenth day for decs. 20°, 40°, and 60°, and tabulated for each hour of R.A. The reduction in R.A. for a star of, say, 68° δ would be effected as follows :—

First obtain reduction of a star of same R.A. and 60° δ by interpolation from tables. Then, with the machine, extract $g \sin (G+a)$ and multiply this by $(\tan 68° - \tan 60°) = 0{\cdot}743$ = natural sine of 47° 59′. Similarly $h \sin (H+a) (\sec 68° - \sec 60°)$ would be obtained, and the sum of these two quantities added to the reduction for 60° (obtained from the tables).

If this method be adopted, it will be advisable to figure the natural sines round the rim of A, and the only quantities required from the logarithm tables will be the tan δ and sec δ of each star.

Note on Mr. Cooke's Paper. By Professor H. H. Turner, M.A., B.Sc.

Just a year ago Mr. Cooke drew attention * to a method of simplifying the calculation of star-corrections in N.P.D., and I followed his paper by an account of some mechanical methods which I had been considering. An apparatus has since been constructed on the plan described in *Monthly Notices* liv. p. 367 by Messrs. Troughton and Simms, and used with success at the Royal Observatory, Greenwich.

Mr. Cooke's present paper, which I received from Sir Charles Todd a few days ago, suggests one or two improvements in this plan, the importance of which I am glad to be the first to recognise. His use of the cross reticule instead of an extra sliding piece is an obvious convenience. But much more important is his remark that it is not necessary to figure the hours, but the minutes only. This reduces the necessary size of the machine to one quarter ; or, in other words, makes it possible to have a scale twice as large as before.

I may perhaps add, in my turn, to his suggestions as follows :—

(1) It is now not necessary to have two pivoted parts of the machine, as he suggests. The arc B may be clamped to the table if only we have a pointer P which may be attached to the revolving ruler in an arbitrary manner. Thus, suppose we wish to find $g \cos (G + a)$, and that $G = 22^h\ 32^m$. Set the ruler to $0^h\ 28^m$, and make the point P fall on the zero line at the distance g. Then figure the hours 3, 4, &c., instead of 0^h, 1^h, &c. Hence

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* *Monthly Notices* vol. liv. p. 358.

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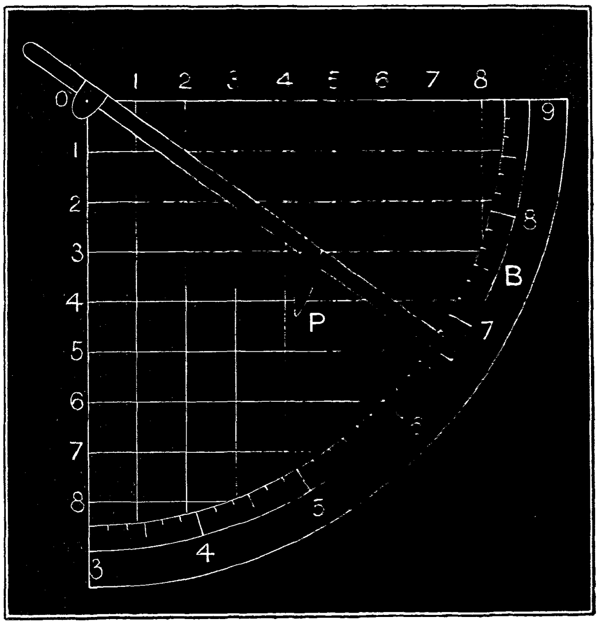
when the ruler reads $3^h\ 28^m$ on B, we get the pointer giving us *g* and 0, which are the cosine and sine required.



(2) If any difficulty is found in having the zinc and paper reticule accurate enough, a glass reticule might be used, such as those employed for the Astrographic Chart. I am proceeding with the consideration of details on these lines.

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A Systematic Comparison between the Places of Stars given in the Cape Catalogue for 1880 *and the Radcliffe Catalogue for* 1890.

By E. J. Stone, M.A., F.R.S., Radcliffe Observer.

My wish is that the Radcliffe Catalogue for 1890 should be regarded as a continuation and completion of the general survey of the southern sky, which I commenced at the Cape in 1870. The agreement or disagreement of the results of these Catalogues is therefore, from my point of view, one of primary importance.

In collecting the materials for the Cape Catalogue, 1880, the chief object in view was to fix the positions of well-distributed zero points from the South Pole, N.P.D. 180°, to less than N.P.D. 115°, with all the accuracy attainable within the limits of the probable error of the mean of at least three observations of each element. In the collection of the materials included in the Radcliffe Catalogue the same plan has been followed for the stars from N.P.D. 115° to the Equator. But it was my earnest wish to render the results *as independent as possible*; and to trust to the agreement or disagreement of the results which overlap as a test of the accuracy attained. I, therefore, purposely made the Oxford observations well overlap those at the Cape to afford materials for this comparison; and I need hardly say that I have looked forward to the result with some natural anxiety.

The comparison has now been systematically and regularly carried out. The number of observations compared has been very considerable; and the work of comparison has involved much arithmetical labour; but the results can be exhibited in the form of tables, without taking up any great amount of space.

I have also added a comparison between the Radcliffe results and those of the Greenwich Ten-year Catalogue for 1880. The systematic differences are nearly the same as those between the Radcliffe Catalogue, 1890, and the Greenwich Five-year Catalogue of 258 Fundamental Stars for 1890, given in the *Monthly Notices* for November, 1894; but the comparisons given in the present paper include a much greater number of stars.

The positions in the Radcliffe Catalogue, 1890, for stars of much greater N.P.D. than 115° are not, of course, of much value, either in R.A. or N.P.D., except for discussion of questions of refraction; and similar remarks apply to those of the Cape Catalogue for N.P.D. much less than 45°.

An examination of the differences in R.A. and N.P.D. between the Radcliffe and Cape Catalogues shows the existence of small but systematic differences both in R.A. and N.P.D. I am not, at present, able to give any perfectly satisfactory explanation of the cause of the change of these differences in R.A. with the N.P.D., which are certainly rather larger than I expected, and which possibly may be chiefly due to the Oxford observations,